# NISTTech

## APPARATUS AND METHOD FOR PROUDUCING AND USING MULTIPLE ELECTRON BEAMS WITH QUANTIZED ORBITAL ANGULAR MOMENTUM IN AN ELECTRON MICROSCOPE

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## Abstract

The following is a description of an apparatus and method for producing and applying electron beams imprinted with phase vortices in an electron microscope. These beams have helical electron wavefronts, and each electron carries and quantized amount of orbital angular momentum and an associated magnetic dipole. Helicity-dependent absorption and scattering of electrons in a specimen, referred to here as electron helical dichroism, can be used to provide new types of information about the sample, but this requires a rapid way to switch the helicty of the probing beam. The invention described here produces multiple beams with different helicities that can be rapidly switched between.

## Inventors

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## References

- 10-025Application

## Status of Availability

This invention is available for licensing exclusively or non-exclusively in any field of use.

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